

# ATOMIC ENERGY

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Dear Sir:

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The power plant design and engineering phase of the Nuclear Energy for Propulsion of Aircraft (NEPA) project has now been reached, with the General Electric Co. to take over from Fairchild Engine and Airplane Corp., who have been doing theoretical studies on the subject. Since October, 1947, Fairchild have been the prime contractor on NEPA, working at Oak Ridge, and with various airplane engine manufacturers, on the problems of propelling an aircraft with the heat of a nuclear reaction. Now Fairchild's work--phase I--has come to a close. In phase II, General Electric, under an Air Force contract, will initiate power plant work on this project at its Aircraft Gas Turbine Division, at Lockland, Ohio, near Cincinnati.

An "economically feasible" process to extract uranium from phosphate ores during the production of triple superphosphate has now been developed, the USAEC said last week. Since the uranium occurs in the phosphate rock (which is found in the northwest, and in Florida), only in very small percentages, the process can only be economic on a by-product basis. Interest in the Florida phosphate beds as potential uranium sources dates back some years; the U.S. Geological Survey has obtained extensive data on the subject for the USAEC. One industrial firm working on the subject for the USAEC is the International Minerals & Chemical Corp., Chicago, with interest stemming from their phosphate, potash fertilizer, and other chemical products which the concern has had many years of experience producing. (Louis Ware, president, International Minerals, recently said that he hoped his firm would be able to produce uranium from phosphate ores in appreciable quantities and on a profitable basis.-AEN: 11/7/50, p.2)

A new radioisotope laboratory, some 33,000-cubic feet in size, is to be built at the Veterans Administration hospital in Indianapolis, Ind., Separate bids may be submitted for (1) general construction, including grading, mechanical work, and outside services, and (2) laboratory equipment. Free drawings and specifications may be obtained from the Director, Technical Service, VA, Washington 25, D.C. The bid closing date is March 13th.

Regulations covering all phases of the radioisotope distribution program appear in the Federal Register, volume 16, number 25. Views and comments on the new rules, which shortly will become part of the Federal Code, may be submitted until March 6th, to the USAEC, at Oak Ridge, Tenn. (Copies of the Federal Register may be obtained from the Superintendent of Documents, Washington 25, D.C.).....A series of 14 motion pictures entitled "The Radioisotope" is being prepared by the Army Signal Corps, with the aid of the USAEC. Although intended for instruction in the armed services, they will be made available to qualified civilian and scientific groups.

LEGAL ASPECTS OF THE U.S. ATOMIC ENERGY PROGRAM: A Special Digest, for readers of this LETTER. (From a speech delivered by USAEC Chairman Gordon Dean, at University of Pittsburgh Law School, Feb. 15th, 1951)

The United States Atomic Energy Commission has been granted powers which exceed those of any administrative agency or industrial enterprise of our time. Having been granted exclusive ownership of all fissionable material (a substance which conceivably could become as significant as coal and petroleum combined), and having been granted the power to control every military or industrial application of atomic energy, the impact of the policies formulated by the Commission greatly influence not only our military security and our foreign policy, but in a large measure the whole structure of our society.

Despite such scope and significance of the atomic energy program, it has hardly left a dent on the substantive law of this country, or on the procedural law. While the Atomic Energy Act of 1946 deals with the control of an inherently devastating force, it has nevertheless not had one-tenth the effect on law, litigation, and legal specialties which the Pure Food and Drug Act has had.

While the hazards of radiation are manifold, they are not reflected in case law or the statutes of this country. Aside from the Federal Act (of 1946) there seems to be no atomic energy legislation except for slight changes in the workmen's compensation laws of a few states. For example, the Tennessee and New Mexico statutes were recently amended so that compensation could be paid for radiation injuries. In New York, the time limit for filing claims was increased to take care of delayed illnesses such as radiation sickness and beryllium poisoning. The ICC, in November, 1947, published a regulation regarding the interstate shipment of radioactive materials, and California has set up minimum standards for protection of employees exposed to ionizing radiation. The field however is so new that it has been difficult to frame realistic legislation.

Since the USAEC carries on practically all of its operations through contractors of one type or another, its legal problems run the gamut of contract law. The USAEC's principal production facilities are conceived, designed, built and operated under contracts with private industries. Major laboratories, such as Argonne, Brookhaven and Oak Ridge, are contract operations. "Lump sum", "cost-plus-fixed-fee", or "cost without fee" contracts are executed in the fields of research and development, engineering, production, raw materials, special procurement, construction and operation.

In 1950, the USAEC awarded some 405 direct contracts for research and development with educational institutions. In the same period, 117 research and development contracts were made with industrial concerns. Subcontracts and procurement orders for research and development during this same period totaled 471 for educational institutions, and 15,038 for industrial concerns.

Additionally, however, the USAEC legal staff must concern itself with scores of problems in the field of the procurement of raw materials, security, regulatory controls, appropriations, legislative programs, patents, city government and community problems (since the USAEC "owns" and maintains the cities of Oak Ridge, Los Alamos, and Richland). Then, there is defense mobilization, including the problems of allocations, priorities, manpower, etc., and the almost innumerable relations with other government agencies, and with other governments.

#### BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Ninth Semiannual Report of the U.S. Atomic Energy Commission. In addition to a review of progress in the atomic energy program (AECN 2/13/51, p.2), business relationships of the contractor with the Commission are outlined in some detail, in this latest report. It describes the types of contracts used by the AEC, the way in which contractors are selected, the methods used by the AEC in the administration of its contracts, and aspects of contractor-labor relations.--Superintendent of Documents, Washington 25, D.C. (40¢)

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS- Single channel differential pulse height analyzer, model 510. (Believed to be the first standardized unit of its character offered for general use.) Makes possible studies of the amplitude distribution of electrical pulses whose amplitudes fall in the range from 0-100 volts. When used with a linear or calibrated particle detecting device, a linear amplifier, and a scaler or other counting means, this instrument make possible studies of the energy distribution of nuclear particles. The instrument allows only those input pulses falling between two set amplitude levels to pass through to the output to be counted or recorded. Pulses of all other amplitudes are rejected in the unit and do not appear at the output.--Atomic Instrument Co., Cambridge 39, Mass.

Anticoincidence analyzer, model 03B. Accurate and proven results are said to have been obtained with this apparatus in connection with counting extremely weak activities with short half-life, such as come from naturally radioactive carbon, etc. This instrument, with proper shielding to reduce background, may be used for extremely low-level tracer work. It is said to be usable for low-level tritium studies, giving more sensitive results than mass spectrometer methods. The instrument consists of transmit and reject amplifier channels feeding an anticoincidence circuit, and is complete with two line and load regulated 500 to 2000-volt high voltage supplies with separate fine and coarse controls.--Atomic Instrument Co., Cambridge 39, Mass.

Remote pipette control, for remote pipetting of radioactive liquids. Makes it possible to perform all necessary pipette operations without handling the pipette at any stage of its use. Usable with pipettes ranging from 100 lambdas to 5 ml. In use, the pipette control grasps the pipette and snugly places the lip in a receptor, which is tapered for air-tight accommodation. At the handle is a built-in hypodermic syringe, normally of 5 ml. capacity, to perform the pipetting operation. Sensitivity may be increased by using a smaller syringe with an appropriate bushing. The instrument is made almost entirely of aluminum, and weighs 7/8-lb.--Nuclear Research & Development, Inc., 1094 Sutter Ave., St. Louis 5, Mo.

Scintillation crystals. Trans-stilbene and p-terphenyl crystals, said to be clear and of high quality are offered cut to customers' specified sizes, and polished.--National Radiac, Inc., Newark 2, N.J.

NEWS & NOTES- Surplus fluorinated organic compounds, from the USAEC's production facilities at Oak Ridge, may now be bought in research quantities, according to S.R. Sapirie, manager for the USAEC at Oak Ridge. Thirty such compounds, on hand in excess of the needs of the atomic energy program, are available in small amounts, he has announced. Lists of the available compounds, their general properties, and costs, may be obtained from Dr. J. D. Gibson, Carbide and Carbon Chemicals Div., P.O. Box P, Oak Ridge, Tenn.

Atomic Instrument Co., Cambridge 39, Mass., now offers its 1951 catalogue showing the various products of this firm....Nuclear Research & Development, Inc., St. Louis 5, Mo., is a new organization acting as consultants in nuclear physics, and offering devices in that field (as above).

A device in use by the Naval Medical Research Institute uses an activated potassium bromide crystal to determine radiation levels within the range of approximately 50 to 100 roentgens. When exposed to gamma rays, the crystal (which is shielded from the effects of moisture) changes from its normal colorless state to distinct blue. The amount of radiation can be determined by comparing the resulting color with a series of standards. Potassium bromide crystals are activated by heating in sodium vapor. It is not expected that these crystals will replace film badges as indicators of cumulative radiation exposure, but that they will be valuable supplements wherever high radiation levels are encountered.

Tracerlab, Inc., Boston, nuclear products firm, has recently made extensive additions to the carbon-14 labeled compounds it can supply. Now available are 4 simple carbon compounds; 6 acetylene and ethylene derivatives; 16 alcohols and their derivatives; 17 acids and their derivatives; 9 amino acids; 7 ring labeled compounds; and 5 amines and their derivatives: all C-14 labeled.

RAW MATERIALS...radioactive ores & other materials for nuclear work...

UNITED STATES: Arvada, Colo.- The increasing interest in beryl (from which beryllium, of importance in nuclear work, is obtained) has resulted in increasing activity at Beryl Ores Co., Arvada. Beryl Ores are buying increasing quantities of beryl, from Colorado mine operators, some with as little as 2.5% BeO content. (10% is usually considered the minimum BeO content that is economic to work.) .....Gunnison, Colo.- Active last season below Gold Creek here was a relatively new venture, Beryllium, Inc., under the direction of C. A. Wemlinger. Reportedly, high-grade beryl ores have been obtained.

CANADA: Reports from LaBine-McCarthy Uranium Mines, on its property in the Montreal River area, 70 miles north of Sault Ste. Marie, are that pitchblende has been unexpectedly encountered in the adit now underway on the property there. In surface work during the past 15 months (the company says), numerous occurrences of uranium and pitchblende were located along a diabase dike at various points. ....This Spring, underground exploration will be carried out on the Leonard series of radioactive fracture zones on the 6 $\frac{1}{2}$ -square mile DDL concession of Rix Athabasca Uranium Mines, near Goldfields, Northern Saskatchewan, the company reports. The most important zone in this series, the No. 1, has been stripped for a length of 370-feet. An average of 30 samples, taken at intervals along the 370-foot length, gave 1.15% uranium oxide equivalent across an average width of 1.5-feet.

SOUTHERN RHODESIA: Beryl is rapidly becoming one of the Colony's most sought after minerals, according to the Office of the High Commissioner for S. Rhodesia. Of importance in nuclear work, monthly production has been over 100-tons of the ore. The mine Mauvekop, in the Bikita area, owned by Mr. D. Lawrie, is said to be the premier beryl producer in this colony, producing almost three-quarters of its total output.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

ARCO, Idaho- With a force of approximately 2,000 persons employed by the various contractors here, rapid progress is being made on the materials testing reactor, the experimental breeder reactor, the land based prototype of a submarine propulsion reactor, and the chemical processing plant. According to Sumner T. Pike, USAEC Commissioner, the design of "two practical though expensive devices for submarine propulsion is practically completed, and one of them is partly built. It shouldn't be many years before one or both will be operating in a true submarine". This was a reference to the submarine reactors being built under AEC contracts by Westinghouse Electric, at Bettis Field, Homestead, Pa., and by General Electric, at Knolls Atomic Power Laboratory, Schenectady, N.Y. The Westinghouse unit is partly built; it will be put into operation at this Arco site, where the building for it is underway (as above).

Describing the experimental breeder reactor, here at Arco, Pike also said that "it is now nearly completed". Of this breeding process, he stated that "it may very well give us a reduction of cost of atomic power to where it can compete with other sources"

SAVANNAH RIVER PLANT, Georgia- Work on the initial phase of this tritium production plant got underway in the last fortnight with the start of the first excavation work here. This is the first of the sub-contracting work to get underway; other contracts have been let, or are in the process of being let, according to Howard Miller, assistant to R. K. Mason, project manager for DuPont, the prime contractor at this job.

OAK RIDGE, Tennessee- Thirty-five ceramic experts from universities, atomic energy installations, and industrial organizations were at a two-day conference recently held at the NEPA (Nuclear Energy Propulsion of Aircraft) division of Fairchild Engine and Airplane Corp., here at Oak Ridge. The meeting covered the aims and objectives of the USAEC Ceramic Coordinator at Washington, a general outline of each participating laboratory's ceramic program, and discussions of fuel elements, coatings and ceramic studies at Hanford Plutonium Works, Washington.



ATOMIC PATENT DIGEST...latest U. S. applications & grants...

PATENTS DEVELOPED THROUGH NUCLEAR ENERGY ACTIVITIES, and owned by the U.S. Government, comprise the latest list of those offered, on a royalty-free, non-exclusive licensing basis. Interested individuals or firms should write the Patent Branch, USAEC, Washington 25, D.C. This group follows: (1) Apparatus for changing the ion source of a cyclotron; U.S. Pat. No. 2,551,065. (2) Diborane purification process; U.S. Pat. No. 2,553, 696. (3) Collimating shield. U.S. Pat. No. 2,553,701. (4) Preparation of compounds of uranium and nonmetals. U.S. Pat. No. 2,554,676. (5) Production of uranium halides. U.S. Pat. No. 2,554,677. (6) Voltage regulation and supply. U.S. Pat. No. 2,555,555. (7) Preparation of uranium hexafluoride. U.S. Pat. No. 2,555,572. (8) Electronic switches. U.S. Pat. No. 2,555,886. (9) Automatic flange system. U.S. Pat. No. 2,556,602. (10) Hydrogen purification system. U.S. Pat. No. 2,556,610. (11) Preparation of uranium hydride. U.S. Pat. No. 2,556,616. (12) Direct current negative feedback amplifier. U.S. Pat. No. 2,556,617. (13) Fast impulse circuits. U.S. Pat. No. 2,556,808. (14) Radiation detector. U.S. Pat. No. 2,556,991. (15) Ion vacuum gauge. U.S. Pat. No. 2,557,775. (16) Chlorofluoroheptanes. U.S. Pat. No. 2,557,777. (17) Combination beta and gamma chamber. U.S. Pat. No. 2,558,632. (18) Alternating current generator. U.S. Pat. No. 2,559,273. (19) Rare earth separation by adsorption and desorption. U.S. Pat. No. 2,559,282. (20) Bearing test apparatus. U.S. Pat. No. 2,559,578. (21) Manufacture of fluorine by electrolysis. U.S. Pat. No. 2,540,248. (22) Latch mechanism. U.S. Pat. No. 2,540,941. (23) Sampling apparatus. U.S. Pat. No. 2,540,944. (24) Electrolytic cell. U.S. Pat. No. 2,540,960. (25) Fluorination of lubricating oil. U.S. Pat. No. 2,541,190. (26) Amplifier. U.S. Pat. No. 2,541,198. (27) Radiography. U.S. Pat. No. 2,541,599. (28) Electronic circuit. U.S. Pat. No. 2,541,940. (29) Apparatus for measuring pressure. U.S. Pat. No. 2,542,905. (30) Continuous separation process. Serial No. 184,269 (An application, not a patent) (31) Process and apparatus for water decontamination. Serial No. 208,421. (An application, not a patent).

RADIOISOTOPES...therapeutic applications...

Radioactive cobalt (Co-60) as a radium substitute has been investigated by I. Meschan, R.R. Edwards, and P.J. Rosenbaum, University of Arkansas. For practical purposes, with a thin filter for the cobalt-60 (such as 0.23 mm. hyperchrome steel), in considering the gamma roentgen equivalency of radium and cobalt-60, the ratio is: cobalt: radium equals 1.3 : 0.84. Using 1.0 mm. cobalt wire, encased in 16-gauge hyperchrome steel tubing, the wall thickness was more than twice that necessary for filtration of the weak beta rays from cobalt-60, and yet was not sufficient to diminish the gamma intensity. The tubing, which was made by the experimenters into needles, was found by them to be resistant to body tissue fluids. In rabbits they found no significant reaction to the hyperchrome tubes. Of interest, is that these cobalt-60 needles may be constructed at a fraction of the cost of "equivalent" radium needles.

Several cases of malignant melanoma, or cancer of pigmented moles, treated with radioactive iodine, have resulted in each case in the arresting of the disease. The work has been done by a research group at the University of Tennessee. As yet, only a small number of such cases has been treated, and a sufficient length of time has not elapsed since the treatment to determine whether the disease will recur. The discovery was made about a year ago, according to one of the group, when treatment was being given a patient, at the University hospital, for thyroid cancer. The researchers noticed that the radioactive iodine, which was being used, also had an effect upon a malignant melanoma with which the same patient was afflicted. The group doing this work is the isotopic therapy committee made up of University of Tennessee, and Knoxville (Tenn.) Academy of Medicine-affiliated medical men.

Sincerely,

The Staff,  
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